

## **AMENDMENTS TO THE CLAIMS**

The following listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. – 42. (Canceled)

43. (Currently Amended) A method of determining the presence of a selected agent in an atmospheric sample with a system including a sample collector, a sample tagger, a sample separator, and a detection component[[.]] , the method comprising:

collecting an atmospheric sample of a selected size of an atmosphere;

mixing a tag with the atmospheric sample;

forming at least one of an interacted tag and an uninteracted tag;

forcing the formation of a collection of at least one of the interacted tag and the uninteracted tag;

detecting the presence of the collection of at least one of the interacted tag and the uninteracted tag; and

outputting the result of the detection;

wherein an interacted tag is formed generally only in the presence of a selected agent.

44. (Original) The method of claim 43, further comprising collecting the selected agent from the collected atmospheric sample for mixing with a tag.

45. (Original) The method of claim 44, further comprising:  
concentrating the selected agents from the atmospheric sample for mixing with a tag.

46. (Original) The method of claim 43, wherein mixing a tag with the atmospheric sample includes:

generally contacting the tag with the selected agent from the atmospheric sample.

47. (Original) The method of claim 43, wherein forming at least one of an interacted tag and an uninteracted tag includes:

binding the tag to the selected agent to form the interacted tag.

48. (Currently Amended) The method of claim 43, wherein forcing the formation of a collection of at least one of the interacted tag and the uninteracted tag includes:

separating said interacted tag from said interacted uninteracted tag using a mass differential between said interacted tag and said uninteracted tag.

49. (Original) The method of claim 43, wherein forming at least one of an interacted tag and said uninteracted tag includes:

separating said interacted tag from said uninteracted tag based upon a dielectric constant differential between said interacted tag and said uninteracted tag.

50. (Original) The method of claim 43, wherein forcing the formation of a collection of at least one of an interacted tag in said uninteracted tag includes:

separating said uninteracted tag from said interacted tag using both a mass separation and a dielectric force separation.

51. (Original) The method of claim 43, wherein forming the uninteracted tag includes not contacting the tag with the selected agent.

52. (Original) The method of claim 43, wherein detecting the presence of the collection includes:

exciting said tag to force said tag to form an emission energy; and  
detecting the emission energy from the excited tag.

53. (Original) The method of claim 52, further comprising:  
determining the presence of more than one collection;  
wherein the presence of more than one collection allows for a determination of the presence of the selected agent.

54. (Original) The method of claim 43, wherein outputting the result of the detection includes outputting the presence of one or more collection.

55. (Original) The method of claim 43, wherein collecting an atmospheric sample includes collecting a plurality of types of the selected agent;

wherein each of the type of selected agent relates to a selected detectable species.

56. (Original) The method of claim 54, wherein mixing a tag with the atmospheric sample includes:

mixing a plurality of types of tags with the plurality of types of selected agents;

wherein each of the types of the plurality of tags interacts with substantially only a single type of the plurality of selected agents to form a plurality of types of interacted tags.

57. (Original) The method of claim 43, wherein forcing the formation of a collection includes forming a formation of a collection in a fluid that is substantially dry.

58. (Original) The method of claim 43, wherein said tag is an up-converter.

59. (Original) The method of claim 43, further comprising:

inducing an emission of a first wavelength from at least one of said interacted tag and said uninteracted tag with a second wavelength;

wherein said first wavelength is less than said second wavelength.

60. (New) A method of determining the presence of a selected agent in an atmospheric sample with a system including a sample collector, a sample tagger, a sample separator, and a detection component, the method comprising:

- collecting an atmospheric sample of a selected size of an atmosphere;
- providing at least a portion of the atmospheric sample to a mixing cell;
- injecting from at least a single injector a tag into the mixing cell;
- mixing the injected tag with the at least a portion of the atmospheric sample;

- forming a volume including at least one of an interacted tag and an uninteracted tag;

- moving the volume to a separation system;

- determining the identity of at least one constituent of the at least a portion of the atmospheric sample at least in part by separating the interacted tag and the uninteracted tag; and

- outputting the result of the determination;

wherein an interacted tag is formed generally only in the presence of a selected agent.

61. (New) The method of Claim 60, further comprising:

- providing a plurality of the injectors; and

- injecting a tag from at least one of the plurality of injectors into the mixing chamber.

62. (New) The method of claim 60, further comprising:  
concentrating the selected agents from the atmospheric sample for mixing  
with a tag.

63. (New) The method of claim 60, wherein determining the identity of at least  
one constituent of the at least a portion of the atmospheric sample includes:  
separating said interacted tag from said interacted tag using a mass  
differential between said interacted tag and said uninteracted tag.

64. (New) The method of Claim 63, wherein separating includes:  
forming a separation chamber that defines a substantially annular  
chamber;  
moving the volume to the separation chamber; and  
rotating the separation chamber around a selected axis.

65. (New) The method of claim 60, wherein forming at least one of an  
interacted tag and said uninteracted tag includes:  
separating said interacted tag from said uninteracted tag based upon a  
dielectric constant differential between said interacted tag and said uninteracted tag.

66. (New) The method of claim 43, wherein forcing the formation of a collection of at least one of an interacted tag in said uninteracted tag includes:

separating said uninteracted tag from said interacted tag using both a mass separation and a dielectric force separation.

67. (New) The method of Claim 60, further comprising:

forming a separation chamber;

providing an optical window;

transmitting energy from an excitation source through the optical window;

exciting a selected portion of the volume.

68. (New) The method of Claim 67, further comprising:

providing a receiver; and

receiving an emitted energy the volume with the receiver.



69. (New) A method of determining the presence of a selected agent in an atmospheric sample with a system including a sample collector, a sample tagger, a sample separator, and a detection component, the method comprising:

- collecting an atmospheric sample of a selected size of an atmosphere;
- providing at least a portion of the atmospheric sample to a mixing cell;
- injecting from at least a single injector a tag into the mixing cell;
- ultrasonically mixing the injected tag with the at least a portion of the atmospheric sample;

- forming a volume including at least one of an interacted tag and an uninteracted tag;

- moving the volume to a separation system;

- separating the volume by spinning the volume in a separation device causing the interacted tag to be separated from the uninteracted tag and both moving to an area including a transmission window, wherein two groups of particles are formed if a selected agent is present, a first group of particles that includes the interconnected tag and a second group of particles that includes the uninteracted tag;

- providing an excitation source to transmit energy through the transmission window to excite at least a portion of the interacted tag or the uninteracted tag;

- receiving an emission from at least a portion of the interacted tag or the uninteracted tag;

- determining the presence of one or more groups of particles; and

- outputting the result of the determination.